

REMARKS

This application has been carefully reviewed in light of the Office Action dated December 12, 2007. Claims 16 to 26 are in the application, of which Claims 16 and 22 are independent. Reconsideration and further examination are respectfully requested.

Applicant acknowledges the Examiner's admonition concerning the listing of references in the specification, and his statement that unless references have been cited by the Examiner on a form PTO-892, they have not been considered. Applicant respectfully submits that this warning goes too far, in the sense that it is clear that the Examiner has considered references even though they were cited by the Applicant, on a form PTO-1449. In keeping with the spirit of the Examiner's admonition, it is noted that most of the references listed in the specification were cited in an Information Disclosure Statement dated October 11, 2007, and that all such cited references have apparently been considered by the Examiner as indicated by his initials on the attached form PTO-1449.

Through an inexplicable oversight, however, a reference listed on the first page of the specification was inadvertently not included in the Information Disclosure Statement. Accordingly, an Information Disclosure Statement, with fee, accompanies this Amendment to cite the omitted reference. It is noted that the reference is a Japanese-language reference, which apparently corresponds to the primary reference relied on by the Examiner in his Office Action, namely, U.S. Patent 6,012,808 (Koitabashi).

It is also noted that an intervening Information Disclosure Statement was filed, dated February 6, 2008. Consideration of the art cited in that intervening Information Disclosure Statement is also respectfully requested.

Paragraphs 3 and 4 of the Office Action entered objections to the drawings. In keeping with these objections, new formal drawings have been attached for Figures 6 and 13A through 13C. The specific changes made in the drawings are as follows:

In Figure 13C, reference numeral "61" has been changed to "561". In Figure 6, the three occurrences of reference numeral "209" have been changed to reference numerals S1, S3 and S5, respectively, as mentioned at pages 21 and 22 of the specification. In Figure 13B, reference numeral "503" has been changed to "502", as mentioned at page 1 of the specification. Finally, a "Prior Art" legend has been added to all of Figures 13A through 13C.

Paragraph 5 of the Office Action entered an additional objection to the drawing, and this objection has been attended to by amendment to the specification rather than by amendment to the drawings. Specifically, reference numeral 199 has been added at page 16, reference numerals 391 and 392 have been added at page 32, and reference numeral 521 has been added at page 6.

In view of the foregoing, withdrawal of the drawing objections is respectfully requested.

Paragraph 7 of the Office Action entered an objection against the specification. In response, the following changes have been made to the specification: reference numeral "505" on page 15 has been changed to "5"; and reference numeral "204"

on page 19 has been changed to “205”. The listing of steps S1 through S5, at page 21, has been attended to by the aforementioned change to Figure 6.

Withdrawal of the objections to the specification is respectfully requested.

Claims 1 to 15 were rejected under 35 U.S.C. § 103(a) over U.S. Patent 6,012,808 (Koitabashi) in view of U.S. Patent 7,101,012 (Kosugi). The rejection is respectfully traversed. As explained in more detail below, Applicant believes that he is the first to develop an ink tank with an optical reflector disposed such that a reflecting surface thereof faces an interior of an ink accommodating chamber that has a light transmittance portion, with a reflecting surface of the optical reflector crossing a vertical direction. Accordingly, in response to the rejection, the claims have been amended by broadening them. Specifically, all of Claims 1 to 15 have been cancelled, and new Claims 16 to 26 substituted therefor. In these new claims, the independent claims are broader than independent Claims 1 and 11 as originally filed, in the sense that these new independent claims omit the concept of an information storage element. (The concept of an information storage element is retained in some of the dependent claims herein.) The basis for traversal is explained in fuller detail below.

The invention as thus defined in independent Claim 16 concerns an ink tank for use in an inkjet printing apparatus, in which the inkjet printing apparatus includes a light emitting section and a light receiving section. The ink tank includes an ink accommodating chamber which directly accommodates ink and which has a light transmittance portion. An optical reflector is disposed so that a reflecting surface thereof faces an interior of the ink accommodating chamber, with a reflecting surface thereof

crossing a vertical direction when the ink tank is placed in a use position in the inkjet printing apparatus.

The positioning of the reflecting surface thus makes an optical path formed by an incidence path and a reflection path. The incidence path is a path along which light emitted from the light emitting section passes through the light transmittance portion and reaches the reflecting surface, and the reflection path is a path along which a reflected light by the reflecting surface passes through the light transmittance portion again and reaches the light receiving section.

By virtue of the foregoing arrangement, there is an advantageous effect in which it becomes possible to detect an amount of ink remaining in the ink tank, with greater precision than that available in conventional ink tanks. Conventional ink tanks are ordinarily hampered in their ability to provide detailed information concerning the residual amount of ink in the ink tank, since such conventional ink tanks merely provide an ink/no-ink detection. That is, conventional ink tanks are able to differentiate between a situation in which there is sufficient ink and a situation in which there is insufficient ink. However, such conventional ink tanks are not able to provide detailed information from which it is possible to determine the quantity of remaining ink. In other words, conventional ink tanks provide arrangements by which it is possible to determine if ink is or is not present, but they do not provide arrangements by which it is possible to determine how much ink remains present.

In the arrangement of Claim 16 herein, however, since the optical reflector is disposed so that its reflecting surface crosses a vertical direction when the ink tank is in

an in-use position, the optical path necessarily travels through a quantity of ink in the ink accommodating chamber. The presence of ink affects the amount of light returned to the light receiving section. The precise effect on the amount of light returned to the light receiving section depends on the quantity of remaining ink such that the amount of returned light can be interpreted so as to determine a quantity of ink remaining in the ink tank, i.e., how much ink remains.

In contrast, Koitabashi discloses an ink tank of conventional arrangement, which provides an ink/no-ink determination. Specifically, Figures 62A and 62B of Koitabashi show an optical reflector 4042 positioned near the base of an ink accommodating chamber. The position of optical reflector 4042 near the bottom of the ink accommodating chamber is an important part of this construction. Specifically, as shown in Figure 62A, the ink accommodating chamber is full. Thus, light emitted from emitting element 4043 is blocked by ink, and there is no light reflected by reflecting element 4042 that returns to light receiving element 4044. In contrast, in Figure 62B, there is no ink. Thus, light emitted from light emitting element 4043 is reflected by reflecting element 4042 and returned to light receiving element 4044. This operation is explained in Koitabashi at column 32, lines 32 through 49.

As such, and in contrast to the arrangement of Claim 16 herein, Koitabashi shows a light reflecting element 4042 which is arranged in a horizontal reflecting arrangement, near the bottom of an ink accommodating chamber. Although this adequately provides an ink/no-ink determination, it falls short of the advantageous effect of the

invention herein, since it is not also able to provide an indication of the quantity of remaining ink.

Kosugi describes the construction of an information storage medium, and at column 9, lines 18 to 22, indicates that his storage medium can be placed at “any arbitrary position, for example, on the top face of ink cartridge 111”. The positioning of Kosugi’s storage medium is not relevant to the positioning of Koitabashi’s reflecting element 4042. Moreover, it is not possible to replace Koitabashi’s reflecting element 4042 at “any arbitrary position”, since doing so would destroy the ink/no-ink determination that characterizes Koitabashi. Stated another way, it is not possible to reposition Koitabashi’s reflecting element 4042 to “any arbitrary position”, since its positioning near the bottom of the ink accommodating chamber is important in the context of Koitabashi.

It is therefore respectfully submitted that Claim 16 recites subject matter that is patentable over any permissible combination of Koitabashi and Kosugi, and allowance is respectfully requested.

Independent Claim 22 is directed to an ink tank for use in an inkjet printing apparatus which includes a light emitting section and a light receiving section. The ink tank includes an ink accommodating chamber which directly accommodates ink and which has a light transmittance portion. An optical reflector is disposed so that a reflecting surface thereof faces an interior of the ink accommodating chamber, wherein the reflecting surface reflects light emitted from the light emitting section through the light transmittance portion and incident on the reflecting surface, and reflects the incident light toward the light receiving section through the light transmittance portion. The optical reflector is

disposed so that both of an incidence path from the light emitting section to the reflecting surface and a reflection path from the reflecting surface to the light transmittance portion cross an ink level, in a measurement state of an amount of ink in the ink tank.

Even when considered in combination, Koitabashi and Kosugi are not seen to disclose or to suggest the foregoing arrangement, particularly as regards the arrangement of an optical reflector which is disposed so that both of an incidence path and a reflection path to and from a reflecting surface of an optical reflector cross an ink level, in a measurement state of an amount of ink in the ink tank.

Applicant's undersigned attorney may be reached in our Costa Mesa, California office at (714) 540-8700. All correspondence should continue to be directed to our below-listed address.

Respectfully submitted,

A handwritten signature in black ink, appearing to read "Michael K. O'Neill", is written over a horizontal line.

Attorney for Applicant
Michael K. O'Neill
Registration No.: 32,622

FITZPATRICK, CELLA, HARPER & SCINTO
30 Rockefeller Plaza
New York, New York 10112-3800
Facsimile: (212) 218-2200

FCHS_WS 2095555v1